Evaluation Plan

Stand Alone Mission of Opportunity Notice (SALMON) Program Element Appendix (PEA) H8

SOFIA Second Generation Instrument Investigations

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Approval

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Principles for Evaluation

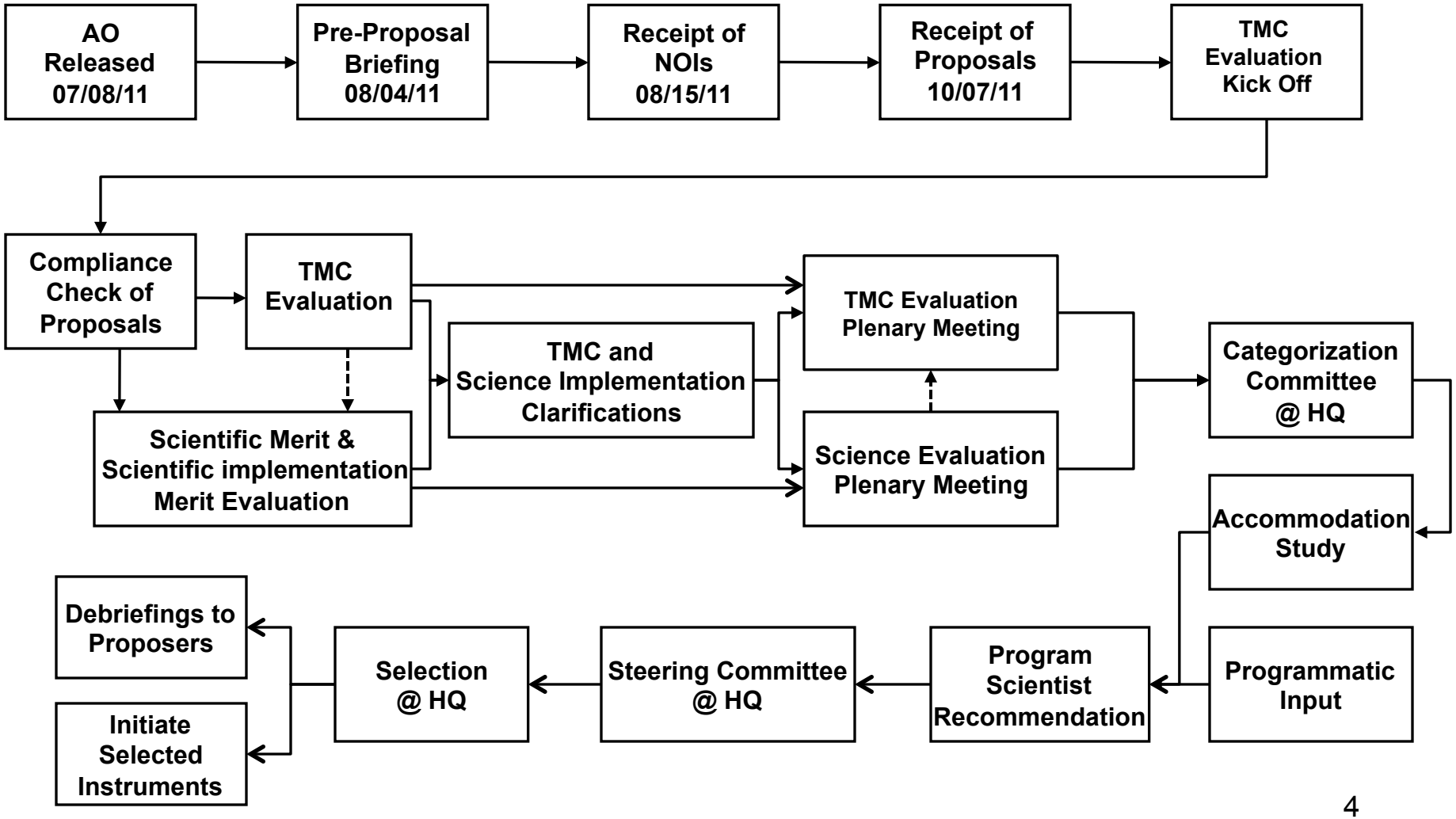
- All proposals are to be treated equally.

- Merit is to be assessed on the basis of material in the proposal.

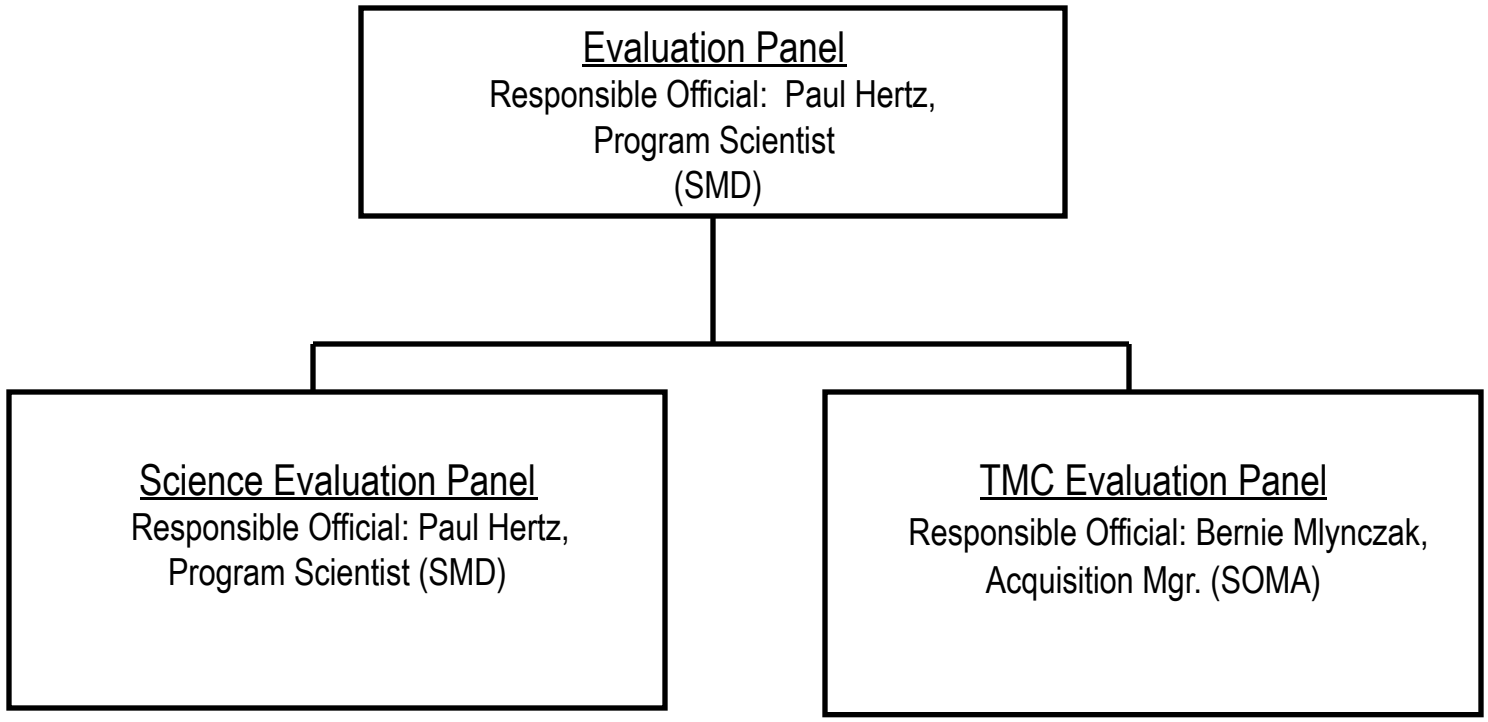
- Ratings should reflect the written strengths and weaknesses.

- Everyone involved in the review process is expected to act in an unbiased objective manner; advocacy for particular proposals is not appropriate.

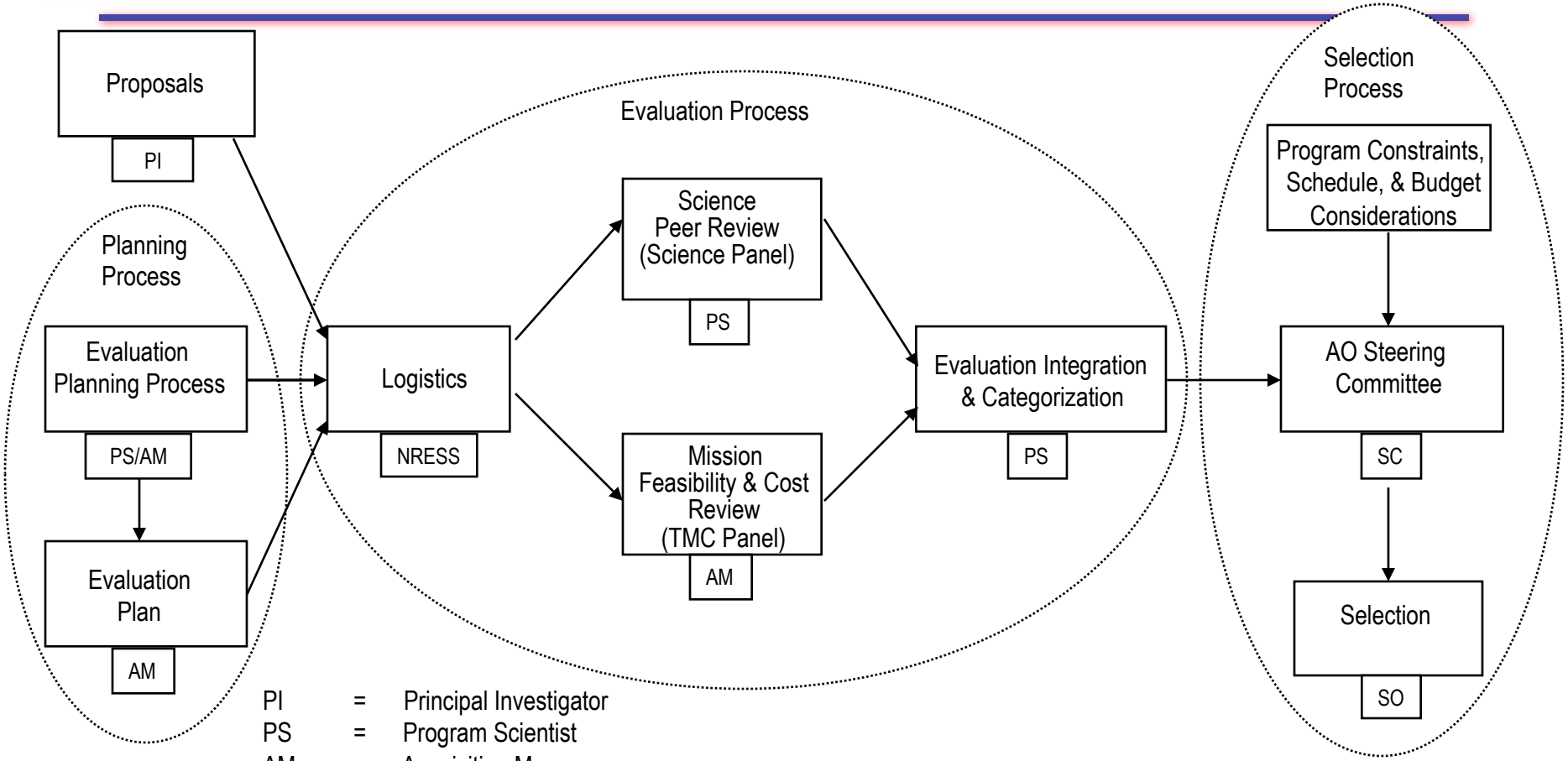
Proposal Evaluation Flow



Evaluation Panel Organization



Step One Evaluation Responsibilities



PI = Principal Investigator
PS = Program Scientist
AM = Acquisition Manager
SC = AO Steering Committee Chair
SO = Selecting Official
NRESS = NASA Research and Education Support Services

Conflicts of Interest (COI)

- Following receipt of proposals, NRESS will cross-check all members of the evaluation panels against the lists of personnel and organizations identified in each proposal, to determine whether any personal or organizational COI exists.

- Following receipt of proposals, ERT will also cross-check all members of the evaluation panels against the lists of personnel and organizations identified in each proposal, to determine whether any personal or organizational COI exists.

- Additionally, all evaluators must divulge any other financial, professional, or potential personal conflicts of interest, and whether they work for a profit-making company that directly competes with any profit-making proposing organization.

- All Civil Service evaluators must file a Form OGE 450 or SF278 which must be submitted to Office of General Counsel for review for financial conflicts of interest.

Conflicts of Interest (COI)

- All known conflict of interest issues are documented and a COI avoidance plan has been developed to minimize the likelihood that this will arise as an issue in the evaluation process. All determinations regarding possible COI that arise will be logged as an appendix to the COI avoidance plan.

- If any previously unknown potential conflict of interest arises during the evaluation, the conflicted member(s) will be notified to stop evaluating proposals immediately, and the Panel Chair will be notified immediately. Any actually conflicted member(s) will be immediately removed from the evaluation process, and steps will be taken, expeditiously, to remove, mitigate, or accept any actual or potential bias imposed by the conflicted member(s).

- Determinations made by the SMD Chief Scientist (who is also serving as the SOFIA Program Scientist) will be reviewed by the Chair of the AO Steering Committee.

- Members of the Science and TMC panels are prohibited from contacting anyone outside their panel for scientific/technical input, or consultation, without the prior approval of the Responsible Official.

Proprietary Data

- All proposal and evaluation materials are considered proprietary.
- Viewing of proposal materials will be only on a need-to-know basis.
- Each evaluator will sign a Non-Disclosure Agreement (NDA) that must be on file at NRESS prior to any proposals being distributed to that evaluator.
- All proposal materials will be numbered and controlled, and a record will be maintained as to which evaluator has what materials.
- Evaluators are not permitted to discuss proposals with anyone outside the Evaluation Team.
- All proprietary information that must be exchanged between evaluators will be exchanged *via* the secure NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES), *via* the secure Remote Evaluation System (RES), secure WebEx or *via* encrypted email, FedEx, fax, or regular mail. Weekly teleconferences among TMC evaluators will be conducted *via* secure telephone lines.
- Proposal materials will be collected from evaluators when the evaluation process is complete. Some copies will be archived in the NRESS and SOMA vaults; all other proposal materials will be destroyed.

Evaluation Ground Rules: General

- All Proposals will be reviewed to uniform standards established in the AO, and without comparison to other Proposals.
- All evaluators will be peers of the proposers in the areas that they evaluate.
- Specialist Reviewers (to provide special technical expertise to the TMC Panel) and non-panel/mail-in Reviewers (to provide special science expertise to the Science Panel) may be utilized, respectively, based on need for expertise in a specific technology or science that is proposed.
- Note: HQ civil servants include IPAs serving in SMD

Evaluation Criteria and Selection Factors

- Evaluation Criteria from SALMON AO NNH08ZDA009O:
  1. Scientific or Technical Merit of the Proposed Investigation (section 7.2.2);
     - PEA H8 section 6.2 – Four additional factors
  2. Implementation Merit and Feasibility of the Proposed Investigation (section 7.2.3);
     - PEA H8 section 6.2 – Four additional factors
  3. Technical, Management, and Cost Feasibility, including Cost Feasibility, of the Proposed Investigation (Section 7.2.4)
     - PEA H8 section 6.2 – One additional factor.
- Weighting: the first criterion is weighted at 40%; the second and third criteria are weighted at 30% each.
- Other Selection Factors:
  - NASA SMD cost;
  - Programmatic factors.

Compliance Checklist
SALMON AO Appendix F

Compliance Criteria

Administrative:

1. Proposal arrived on time.
2. Meets page limits
3. Meets general guidelines
4. Required appendices included
5. No additional appendices included
6. Budgets are submitted in required formats

Compliance Criteria

Scientific:

7. Addresses the solicited NASA Mission Directorate programs.
8. Requirements traceable from science to hardware to mission
9. Appropriate data archiving plan
10. Defines both a baseline investigation and potential descope options
11. Allocation of sufficient resources for data analysis has been demonstrated.

Compliance Criteria

Technical/Management/Cost (as applicable):

12. Proposed complete investigation (Phases A-F) for MO category
13. Description of E/PO outline and commitment, if any (E/PO) is optional.
14. Includes subcontracting and SDB commitments (if applicable)
15. Team led by single PI
16. Proposed budget within cost cap.
17. Phase A costs within cost limit.
18. Co-I cost in budget
19. Commitment date prior to cutoff
20. Co-Is indicate their commitment to the proposed investigation through NSPIRES
21. U.S. letters of commitment from all organizations contributing critical goods and services, from all major participants, and from any required funding organizations
22. Table describing non-U.S. participation
23. Non-U.S. letters of commitment from participating institution
24. Non-U.S. letters of commitment from funding agencies including binding law statement

Science Evaluation

Science Panel Composition and Organization

- The Program Scientist leads the Science Panel.
- Science evaluators are typically, but not exclusively, recruited from the academic, governmental, and industrial research communities.
- The Science Panel evaluates Science Merit and Scientific Implementation Merit and Feasibility.
- The science evaluation will be implemented *via* one Science Panel, but sub-panels will be employed, depending on the number and variety of proposed investigations.
  - Any sub-panel will be led by a NASA Civil Servant, with a co-chair from the scientific community.
  - Sub-panels may have an Executive Secretary.
- Each proposal will be reviewed by minimum of 3 panel members.
  - The Lead Reviewer for each proposal will lead the discussion.
  - A Supporting Reviewer will take notes on the discussion.
- The TMC Panel may provide comments and questions to the Science Panel.

Science Panel Procedures

- Each member of the Science Panel will review Proposals as directed by the Chair.
  - If special science expertise is required, the Science Panel may utilize non-panel/ mail-in reviewers to assist with one or more proposals.
  - Non-panel/mail-in reviewers will evaluate only those parts of proposals pertinent to their scientific specialties.
- Each proposal will be discussed by the reviewers in a telecon.
  - Each reviewers will provide an individual review prior to the telecon.
  - The telecon will discuss the proposal and the reviews by the individual reviewers including non-panel reviewers.
  - Following the telecon, the Lead Reviewer captures/synthesizes individual evaluations including discussion and will generate the Draft Evaluation including draft findings.
  - The draft findings form the basis for the clarification of draft major weaknesses.

Science Panel Procedures

- A Science Panel Plenary will be held upon completion of Science Evaluation for all proposals.
  - The Science Panel will compile all of the findings for each proposal.
  - For each proposal, the Chair or designated Lead Reviewer will lead the discussion, summarize the proposed investigation, and document the results.
  - The clarifications provided by the PIs will be considered and the findings will be adjusted if warranted.
  - If warranted, the panel may reconsider evaluations at the Plenary.
  - Evaluations of all proposals are reviewed during the Science Panel Plenary to ensure that standards have been applied uniformly and in an appropriate and fair manner.
  - The Lead Reviewer captures/synthesizes Panel evaluations.

Science Panel Products

For each proposal, the Science evaluation will result in:

- Form A
  - Proposal title, PI name, and submitting organization;
  - Proposal summary
  - Based on findings, Scientific Merit adjectival ratings from each evaluator, ranging from “Excellent” to “Poor”;
  - Summary rationale for the median rating;
  - Narrative findings, identified as major or minor strengths or weaknesses;
  - Comments to PI, comments to NASA;
- Form B
  - Proposal title, PI name, and submitting organization;
  - Based on findings, a Implementation Merit and Feasibility of the Investigation adjectival ratings from each evaluator, ranging from “Excellent” to “Poor”;
  - Summary rationale for the median rating;
  - Narrative findings, identified as major or minor strengths or weaknesses;
  - Comments to PI; comments to NASA.

Science Panel Evaluation Factors

Criterion A: Scientific or Technical Merit of the Proposed Investigation:

- Factors from SALMON AO section 7.2.2
  - The impact of the investigation on one or more of the science, research, or technology programs identified in the NASA Strategic Plan
  - How well the investigation fills gaps in the understanding of science and thereby provides for progress
  - How well the proposed investigation synergistically supports other ongoing science missions
  - Whether the data that are proposed to be gathered will be sufficient to complete the proposed investigation
- Addition factors from PEA H8 section 6.2
  - The extent to which the proposed science investigation addresses high priority science objectives, as defined in Section 2 of this program element appendix.
  - The extent to which the proposed instrument generally enables high priority science objectives, as defined in Section 2 of this program element appendix, beyond the proposer's science investigation.
  - The extent to which the proposed instrument takes advantage of the capabilities of the SOFIA observatory.
  - For technology demonstration science instrument investigations, the merit of the science investigations enabled by the matured and demonstrated technology.

Science Panel Evaluation Factors

Criterion B: Implementation Merit and Feasibility of the Proposed Investigation:

- Factors from SALMON AO section 7.2.3
  - The feasibility, resiliency, and the probability of success
  - The degree to which the investigation will address the proposed scientific or technical goals and objectives
  - The degree to which the proposed instrument(s) or technology can be built using the proposed methods
  - The degree to which the proposed instrument(s) or technology can provide the necessary data
  - The degree to which the mission will support the accomplishment of acquisition of the required data
  - The plan for completing technology development
  - The plan for data analysis
  - The likelihood of success for new technology
  - Science team roles, experience, expertise, and the organizational structure of the science team
  - The technical risk associated with the overall instrument
  - The role of each Co-I will be evaluated for necessary contributions to the proposed investigation
- Addition factors from PEA 8 section 6.2
  - The extent to which the proposed instrument is compatible with SOFIA interfaces and operations.
  - The maturity of the design or the demonstration of a clear path to achieve the necessary maturity.
  - The quality of the plans for calibration and data archiving, including development of a data pipeline.
  - For technology demonstration science instrument investigations, the value of the matured and demonstrated technology to SOFIA and future NASA missions.

Science Evaluation Products: Strengths and Weaknesses

- **Major Strength:** A facet of the response that is judged to be well above expectations and substantially contributes to the merit.
- **Major Weakness:** A deficiency or set of deficiencies taken together that are judged to substantially detract from the merit.
- **Minor Strength:** A strength that substantiates the merit.
- **Minor Weakness:** A weakness that detracts from the merit.

Form A and B Grade Definitions

Form A and B Grade Definitions

- **Excellent**: A comprehensive, thorough, and compelling proposal of exceptional merit that fully responds to the objectives of the AO as documented by numerous and/or significant strengths and having no major weaknesses.
- **Very Good**: A fully competent proposal of very high merit that fully responds to the objectives of the AO, whose strengths fully outbalance any weaknesses.
- **Good:** A competent proposal that represents a credible response to the AO, having neither significant strengths nor weakness and/ or whose strengths and weaknesses essentially balance.
- **Fair**: A proposal that provides a nominal response to the AO but whose weaknesses outweigh any perceived strengths.
- **Poor**: A seriously flawed proposal having one or more major weaknesses (e.g., an inadequate or flawed plan of research, or lack of focus on the objectives of the AO).

TMC Evaluation

TMC Panel Composition and Organization

- The Acquisition Manager, who is a Civil Servant in the Science Office of Mission Assessments (SOMA) at Langley Research Center, leads the TMC panel.
  - SOMA works directly for NASA Headquarters and is firewalled from the rest of LaRC.
- TMC evaluators are a mix of the best non-conflicted contractors, consultants, and Civil Servants who are experts in their respective fields.
  - All evaluators read every proposal.
  - Evaluators provide ratings of proposals as well as findings.
- Additionally, specialist reviewers may be called upon in cases where technical expertise that is not represented on the panel is needed.
  - Specialist reviewers evaluate only those parts of a proposal that are specific to their particular expertise.
  - Specialist reviewers provide only findings; they do not provide ratings.

TMC Panel Evaluation Factors

Criterion C: Feasibility of the Mission Implementation, Including Cost Risk:

- Factors from SALMON AO section 7.2.4
  - Technical, management, and cost feasibility, including cost risk
  - Likelihood of success for technical and management approaches
  - Assessment of risk of completing the investigation within the proposed schedule and cost
  - Implementation factors such as the overall design; design margins; proposers' understanding of the processes, products, and activities required to accomplish development and integration of all elements
  - Adequacy of the proposed organizational structure, the roles and experience of the known partners, the management approach, the commitments of partners and contributors, and the team's understanding of the scope of work
  - Relationship of the work to the schedule, the mission's interdependencies, and associated schedule margins
  - Flexibility to recover from problems
  - Methods and rationale used to develop the estimated cost, and the discussion of cost risks
  - Adequacy of the cost reserves
  - Risk management approach
  - Role, qualifications, and experience of the PI and PM, experience and past performance of the implementing institutions
- Addition factors from PEA 8 section 6.2
  - The feasibility of the plans for achieving airworthiness and instrument acceptance.

TMC Evaluation Sub-Factors

- **Instrument**
  - Instrument Design, Accommodation, and Interface
  - Design Heritage
  - Environment Concerns
  - Technology Readiness
  - Instrument Systems Engineering
  - Plans for achieving airworthiness and instrument acceptance
- **Management and Schedule**
  - Roles and Responsibilities
  - Team Experience and Key Individuals' Qualifications
  - Project Management and Systems Engineering
  - Organizational Structure and Work Breakdown Schedule (WBS)
  - International Participation
  - Risk Management, Including De-scope Plan and Decision Milestones
  - Project-Level Schedule
- **Cost**
  - Basis of Estimate (BOE)
  - Cost Realism and Completeness
  - Cost Reserves by Phase
  - Comparison with TMC Estimates (Including Parametric Models and Analogies)

TMC Panel Products

For each proposal, the TMC evaluation will result in a Form C that contains:

- Proposal title, PI name, and submitting organization;
- An adjectival risk ratings from each evaluator of “Low Risk”, “Medium Risk” or “High Risk” for the TMC Feasibility of the Mission Implementation, Including Cost Risk that is derived based on the findings;
- Summary rationale for the median risk rating;
- Narrative findings, identified as major or minor strengths or weaknesses, including cost analysis;
- Comments to the PI, comments to NASA, comments to the Science Panel.

TMC Evaluation Products: Strengths and Weaknesses

Major and minor strengths and weaknesses are defined as follows:

- **Major Strength:** A facet of the implementation response that is judged to be well above expectations and can substantially contribute to the ability of the project to meet its technical requirements on schedule and within cost.

- **Minor Strength:** A strength that is worthy of note and can be brought to the attention of Proposers during debriefings, but is not a discriminator in the assessment of risk.

- **Major Weakness:** A deficiency or set of deficiencies taken together that are judged to substantially weaken the project's ability to meet its technical objectives on schedule and within cost.

- **Minor Weakness:** A weakness that is sufficiently worrisome to note and can be brought to the attention of Proposers during debriefings, but is not a discriminator in the assessment of risk.

*Note: Findings that are considered "as expected" are not documented in the Form C.

TMC Evaluation Products: Risk Ratings

Based on the narrative findings, each proposal will be assigned one of three risk ratings, defined as follows:

- **Low Risk:** There are no problems evident in the proposal that cannot be normally solved within the time and cost proposed. Problems are not of sufficient magnitude to doubt the Proposer's capability to accomplish the investigation within available resources.

- **Medium Risk:** Problems have been identified, but are considered within the proposal team's capabilities to correct within available resources, with good management and application of effective engineering practices. Mission design may be complex and resources tight.

- **High Risk:** One or more problems are of sufficient magnitude and complexity as to be deemed unsolvable within the available resources.

- *Note: Only Major Findings are considered in the risk rating.

Cost Analysis in Support of the Form C

- Initial cost analyses will be accomplished on the basis of information provided in the proposals (consistency, completeness, proposed basis of estimate, contributions, use full cost accounting, maintenance of reserve levels, and cost management, etc.).
- Cost will be evaluated for each proposal with two different methods.
- Cost threats, risks, and risk mitigations will be analyzed.
- Cost realism (a.k.a. “cost risk”) is based on models, analogies, heritage, and grass roots information from proposals.
  - Cost Realism is reported as an adjectival rating, ranging from “Low Risk” to “High Risk” on a five-point scale.
- Cost Evaluation Summaries and draft Forms C will be completed to the same level of detail prior to the Plenary.
- During the TMC plenary, the entire panel will participate in Cost deliberations:
  - All information from the entire evaluation process will be considered in the final cost assessment.
- Significant findings from the Cost Evaluation Summaries will be documented in the Cost and Schedule Factor on Form C and considered in the Form C grade.

Request for Clarification

Evaluation: Clarifications from Proposers

NASA will request clarification of potential major weaknesses in the TMC Feasibility of the Mission Implementation and the Science Implementation that have been identified by the evaluation panels for those criteria. NASA will not request clarification for the Science Merit.

- NASA will request such clarification uniformly, from all proposers.
- All requests for clarification from NASA, and the proposer's response, will be in writing.
- The ability of proposers to provide clarification to NASA is extremely limited, as NASA does not intend to enter into discussions with proposers.
- PIs whose proposals have no major weaknesses will receive an email informing them.
- The form of the clarifications is strictly limited to a few types of responses:
  - Identification of the locations in the proposal (page(s), section(s), line(s)) where the major weakness is addressed.
  - Noting that the major weakness is not addressed in the proposal.
  - Stating that the major weakness is invalidated by information that is common knowledge and is therefore not included in the proposal.
  - Stating that the analysis leading to this potential major weakness is incorrect and identifying a place in the proposal where data supporting a correct analysis may be found.
  - Stating that a typographical error appears in the proposal and that the correct data is available elsewhere inside or outside of the proposal.

The PI will be given 24 hours to respond to the request for clarification. Any response that goes beyond a clarification will be deleted and will not be shown to the evaluation panel.

Categorization

Categorization

- Upon completion of the evaluations, the results will be presented to the Categorization Committee, an *ad hoc* subcommittee of the SMD AO Steering Committee composed solely of Civil Servants and appointed by the Associate Administrator for SMD.

- This committee will consider the peer review results and, based on the evaluations, will categorize each proposal according to procedures required by NFS 1872.403-1(e). The categories are defined as:
  - Category I. Well conceived and scientifically and technically sound investigations pertinent to the goals of the program and the AO's objectives, and offered by a competent investigator from an institution capable of supplying the necessary support to ensure that any essential flight hardware or other support can be delivered on time and data that can be properly reduced, analyzed, interpreted, and published in a reasonable time. Investigations in Category I are recommended for acceptance and normally will be displaced only by other Category I investigations.

Categorization (continued)

- Category II. Well conceived and scientifically or technically sound investigations which are recommended for acceptance, but at a lower priority than Category I.
- Category III. Scientifically or technically sound investigations which require further development. Category III investigations may be funded for development and may be reconsidered at a later time for the same or other opportunities.
- Category IV. Proposed investigations that are recommended for rejection for the particular opportunity under consideration, whatever the reason.

Evaluation Process Conclusion

Once Categorization has been completed, the Evaluation is considered ended unless found deficient by a subsequent review.